Union Calendar No. 344

108TH CONGRESS
2D SESSION

H. R. 4218

[Report No. 108–580]

To amend the High-Performance Computing Act of 1991.

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IN THE HOUSE OF REPRESENTATIVES

APRIL 27, 2004

Mrs. BIGGERT (for herself, Mr. DAVIS of Tennessee, Mr. BOEHLERT, and Mr. JOHNSON of Illinois) introduced the following bill; which was referred to the Committee on Science

JULY 1, 2004

Additional sponsors: Mr. EHLERS, Ms. WOOLSEY, Mr. SMITH of Michigan, and Mr. GORDON

JULY 1, 2004

Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

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A BILL

To amend the High-Performance Computing Act of 1991.

1   *Be it enacted by the Senate and House of Representa-*

2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4   This Act may be cited as the "High-Performance

5 Computing Revitalization Act of 2004".

SEC. 2. DEFINITIONS.

Section 4 of the High-Performance Computing Act of 1991 (15 U.S.C. 5503) is amended—

(1) in paragraph (2), by inserting "and multi-disciplinary teams of researchers" after "high-performance computing resources";

(2) in paragraph (3)—

(A) by striking "scientific workstations,";

(B) by striking "(including vector super-computers and large scale parallel systems)";

(C) by striking "and applications" and inserting "applications"; and

(D) by inserting ", and the management of large data sets" after "systems software";

(3) in paragraph (4), by striking "packet switched"; and

(4) by amending paragraphs (5) and (6) to read as follows:

"(5) 'Program' means the High-Performance Computing Research and Development Program described in section 101; and

"(6) 'Program Component Areas' means the major subject areas under which are grouped related individual projects and activities carried out under the Program.".

SEC. 3. HIGH-PERFORMANCE COMPUTING RESEARCH AND DEVELOPMENT PROGRAM.

Title I of the High-Performance Computing Act of 1991 (15 U.S.C. 5511 et seq.) is amended—

(1) in the title heading, by striking "**AND THE NATIONAL RESEARCH AND EDUCATION NETWORK**" and inserting "**RESEARCH AND DEVELOPMENT**";

(2) in section 101—

(A) the section heading, by striking "**NATIONAL HIGH-PERFORMANCE COMPUTING**" and inserting "**HIGH-PERFORMANCE COMPUTING RESEARCH AND DEVELOPMENT**";

(B) in subsection (a)—

(i) in the subsection heading, by striking "NATIONAL HIGH-PERFORMANCE COMPUTING" and inserting "HIGH-PERFORMANCE COMPUTING RESEARCH AND DEVELOPMENT";

(ii) by striking paragraphs (1) and (2) and inserting the following: "(1) The President shall implement a High-Performance Computing Research and Development Program, which shall—

1   ''(A) provide for long-term basic and ap-

2   plied research on high-performance computing;

3   ''(B) provide for research and development

4   on, and demonstration of, technologies to ad-

5   vance the capacity and capabilities of high-per-

6   formance computing and networking systems;

7   ''(C) provide for sustained access by the

8   research community in the United States to

9   high-performance computing systems that are

10   among the most advanced in the world in terms

11   of performance in solving scientific and engi-

12   neering problems, including provision for tech-

13   nical support for users of such systems;

14   ''(D) provide for efforts to increase soft-

15   ware availability, productivity, capability, secu-

16   rity, portability, and reliability;

17   ''(E) provide for high-performance net-

18   works, including experimental testbed networks,

19   to enable research and development on, and

20   demonstration of, advanced applications enabled

21   by such networks;

22   ''(F) provide for computational science and

23   engineering research on mathematical modeling

24   and algorithms for applications in all fields of

25   science and engineering;

1   "(G) provide for the technical support of,

2   and research and development on, high-per-

3   formance computing systems and software re-

4   quired to address Grand Challenges;

5   "(H) provide for educating and training

6   additional undergraduate and graduate students

7   in software engineering, computer science, com-

8   puter and network security, applied mathe-

9   matics, library and information science, and

10   computational science; and

11   "(I) provide for improving the security of

12   computing and networking systems, including

13   Federal systems, including research required to

14   establish security standards and practices for

15   these systems.";

16   (iii) by redesignating paragraphs (3)

17   and (4) as paragraphs (2) and (3), respec-

18   tively;

19   (iv) in paragraph (2), as so redesig-

20   nated by clause (iii) of this subpara-

21   graph—

22   (I) by striking subparagraph (B);

23   (II) by redesignating subpara-

24   graphs (A) and (C) as subparagraphs

25   (D) and (F), respectively;

1   (III) by inserting before subpara-

2   graph (D), as so redesignated by sub-

3   clause (II) of this clause, the following

4   new subparagraphs:

5   "(A) establish the goals and priorities for Fed-

6 eral high-performance computing research, develop-

7 ment, networking, and other activities;

8   "(B) establish Program Component Areas that

9 implement the goals established under subparagraph

10 (A), and identify the Grand Challenges that the Pro-

11 gram should address;

12   "(C) provide for interagency coordination of

13 Federal high-performance computing research, devel-

14 opment, networking, and other activities undertaken

15 pursuant to the Program;"; and

16   (IV) by inserting after subparagraph

17   (D), as so redesignated by subclause (II)

18   of this clause, the following new subpara-

19   graph:

20   "(E) develop and maintain a research, develop-

21 ment, and deployment roadmap for the provision of

22 high-performance computing systems under para-

23 graph (1)(C); and"; and

1 　　　　　(v) in paragraph (3), as so redesig-

2 　　　　nated by clause (iii) of this subpara-

3 　　　　graph—

4 　　　　　　　(I) by striking "paragraph

5 　　　　　　(3)(A)" and inserting "paragraph

6 　　　　　　(2)(D)";

7 　　　　　　　(II) by amending subparagraph

8 　　　　　　(A) to read as follows:

9 　　"(A) provide a detailed description of the Pro-

10 　gram Component Areas, including a description of

11 　any changes in the definition of or activities under

12 　the Program Component Areas from the preceding

13 　report, and the reasons for such changes, and a de-

14 　scription of Grand Challenges supported under the

15 　Program;";

16 　　　　　　　(III) in subparagraph (C), by

17 　　　　　　striking "specific activities" and all

18 　　　　　　that follows through "the Network"

19 　　　　　　and inserting "each Program Compo-

20 　　　　　　nent Area";

21 　　　　　　　(IV) in subparagraph (D), by in-

22 　　　　　　serting "and for each Program Com-

23 　　　　　　ponent Area" after "participating in

24 　　　　　　the Program";

1   (V) in subparagraph (D), by

2   striking "applies;" and inserting "ap-

3   plies; and";

4   (VI) by striking subparagraph

5   (E) and redesignating subparagraph

6   (F) as subparagraph (E); and

7   (VII) in subparagraph (E), as so

8   redesignated by subclause (VI) of this

9   clause, by inserting "and the extent to

10   which the Program incorporates the

11   recommendations of the advisory com-

12   mittee established under subsection

13   (b)" after "for the Program";

14   (C) in subsection (b)—

15   (i) by redesignating paragraphs (1)

16   through (5) as subparagraphs (A) through

17   (E), respectively;

18   (ii) by inserting "(1)" after "ADVI-

19   SORY COMMITTEE.—";

20   (iii) in paragraph (1)(C), as so redes-

21   ignated by clauses (i) and (ii) of this sub-

22   paragraph, by inserting ", including fund-

23   ing levels for the Program Component

24   Areas" after "of the Program";

1   (iv) in paragraph (1)(D), as so redes-
2   ignated by clauses (i) and (ii) of this sub-
3   paragraph, by striking "computing" and
4   inserting "high-performance computing
5   and networking"; and

6   (v) by adding at the end the following
7   new paragraph:

8   "(2) In addition to the duties outlined in paragraph
9 (1), the advisory committee shall conduct periodic evalua-
10 tions of the funding, management, coordination, imple-
11 mentation, and activities of the Program, and shall report
12 not less frequently than once every two fiscal years to the
13 Committee on Science of the House of Representatives
14 and the Committee on Commerce, Science, and Transpor-
15 tation of the Senate on its findings and recommendations.
16 The first report shall be due within one year after the date
17 of enactment of this paragraph."; and

18   (D) in subsection (c)(1)(A), by striking
19   "Program or" and inserting "Program Compo-
20   nent Areas or"; and

21   (3) by striking sections 102 and 103.

SEC. 4. AGENCY ACTIVITIES.

23   Title II of the High-Performance Computing Act of
24 1991 (15 U.S.C. 5521 et seq.) is amended—

1   (1) by amending subsection (a) of section 201

2   to read as follows:

3   "(a) GENERAL RESPONSIBILITIES.—As part of the

4 Program described in title I, the National Science Foun-

5 dation shall—

6   "(1) support research and development to gen-

7   erate fundamental scientific and technical knowledge

8   with the potential of advancing high-performance

9   computing and networking systems and their appli-

10   cations;

11   "(2) provide computing and networking infra-

12   structure support to the research community in the

13   United States, including the provision of high-per-

14   formance computing systems that are among the

15   most advanced in the world in terms of performance

16   in solving scientific and engineering problems, and

17   including support for advanced software and applica-

18   tions development, for all science and engineering

19   disciplines; and

20   "(3) support basic research and education in all

21   aspects of high-performance computing and net-

22   working.";

23   (2) by amending subsection (a) of section 202

24   to read as follows:

1 ''(a) GENERAL RESPONSIBILITIES.—As part of the
2 Program described in title I, the National Aeronautics and
3 Space Administration shall conduct basic and applied re-
4 search in high-performance computing and networking,
5 with emphasis on—

6   ''(1) computational fluid dynamics, computa-
7   tional thermal dynamics, and computational aero-
8   dynamics;

9   ''(2) scientific data dissemination and tools to
10   enable data to be fully analyzed and combined from
11   multiple sources and sensors;

12   ''(3) remote exploration and experimentation;
13   and

14   ''(4) tools for collaboration in system design,
15   analysis, and testing.'';

16   (3) in section 203—

17   (A) by striking subsections (a) through (d)
18   and inserting the following:

19 ''(a) GENERAL RESPONSIBILITIES.—As part of the
20 Program described in title I, the Secretary of Energy
21 shall—

22   ''(1) conduct and support basic and applied re-
23   search in high-performance computing and net-
24   working to support fundamental research in science

1 and engineering disciplines related to energy applica-

2 tions; and

3   ''(2) provide computing and networking infra-

4 structure support, including the provision of high-

5 performance computing systems that are among the

6 most advanced in the world in terms of performance

7 in solving scientific and engineering problems, and

8 including support for advanced software and applica-

9 tions development, for science and engineering dis-

10 ciplines related to energy applications.''; and

11   (B) by redesignating subsection (e) as sub-

12   section (b);

13   (4) by amending subsection (a) of section 204

14 to read as follows:

15 ''(a) GENERAL RESPONSIBILITIES.—As part of the

16 Program described in title I—

17   ''(1) the National Institute of Standards and

18 Technology shall—

19   ''(A) conduct basic and applied metrology

20   research needed to support high-performance

21   computing and networking systems;

22   ''(B) develop benchmark tests and stand-

23   ards for high-performance computing and net-

24   working systems and software;

1 　　　　"(C) develop and propose voluntary stand-

2 　　　　ards and guidelines, and develop measurement

3 　　　　techniques and test methods, for the interoper-

4 　　　　ability of high-performance computing systems

5 　　　　in networks and for common user interfaces to

6 　　　　high-performance computing and networking

7 　　　　systems; and

8 　　　　"(D) work with industry and others to de-

9 　　　　velop, and facilitate the implementation of,

10 　　　　high-performance computing applications to

11 　　　　solve science and engineering problems that are

12 　　　　relevant to industry; and

13 　　"(2) the National Oceanic and Atmospheric Ad-

14 　　ministration shall conduct basic and applied research

15 　　on high-performance computing applications, with

16 　　emphasis on—

17 　　　　"(A) improving weather forecasting and

18 　　　　climate prediction;

19 　　　　"(B) collection, analysis, and dissemination

20 　　　　of environmental information; and

21 　　　　"(C) development of more accurate models

22 　　　　of the ocean-atmosphere system."; and

23 　　(5) by amending subsection (a) of section 205

24 　　to read as follows:

1   ''(a) GENERAL RESPONSIBILITIES.—As part of the

2 Program described in title I, the Environmental Protec-

3 tion Agency shall conduct basic and applied research di-

4 rected toward advancement and dissemination of computa-

5 tional techniques and software tools for high-performance

6 computing systems with an emphasis on modeling to—

7   ''(1) develop robust decision support tools;

8   ''(2) predict pollutant transport and the effects

9   of pollutants on humans and on ecosystems; and

10   ''(3) better understand atmospheric dynamics

11   and chemistry.''.

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